VT 100 Weight Indicator
User's Guide

Revision A, June 2004 **Doc # UM-VT 100-EN**

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Safety Instructions

The following instructions serve as a general guide for the safe operation of the VT 100. This User.s Manual is intended for users of the Weight Indicator, who are prohibited from installing, calibrating, setting up or servicing the product. Only qualified and authorized service personnel should install the product, set it up, calibrate it, or carry out adjustment, maintenance or repairs.

Safety Symbols

This symbol indicates potential safety hazards regarding product operation or maintenance to the operator or service personnel.

General Safety Practices

Do not touch or tamper with the power supply when the power cord is connected. Line voltages may be present even when the product is powered off or a fuse is blown.

Before working on equipment connected to power lines or to other devices, remove jewelry or any other metallic object that may come into contact with energized parts.

The product is intended to be grounded during normal use. Grounding is provided by connecting the mains plug to a wall socket with a protective earth terminal. The earth lug provided on the product should be connected to the protective earth at all times, by a wire with a diameter of 18 AWG or wider.

Always make the ground connection first and disconnect it last. Do not connect data cables to ungrounded equipment. Make sure that all other cables are disconnected before disconnecting the ground.

Special Safety Warnings

Welding on or in the vicinity of the equipment is strictly prohibited.

Use reliable lightning conductors to prevent static loads caused by thunderstorms.

Connection of AC Mains

Make sure that the electrical installation complies with local codes. Always connect the AC plug to a wall socket with a protective ground.

The maximum permissible current capability of the branch distribution circuit that supplies power to the product is 16A. The circuit breaker in the building installation should have high breaking capacity and must operate at short-circuit current exceeding 35A.

Always connect the power cord first to the equipment and then to the wall socket. If the power cord cannot be readily disconnected in case of emergency, make sure that a readily accessible circuit breaker or emergency switch is installed in the building.

Operating Environment

Ambient Temperature	Storage temperature: -10C to +70C (14F to 158F). Operating temperature: -10C to +40C (14F to 104F).
Humidity	40% to 90% RH (non condensing).
Vibration	Severe vibration can affect the accuracy of weighing and damage components.
Air	The air surrounding the product should be dust-free and should not contain corrosive gasses or other materials that could adversely effect the product.
Electromagnetic Fields	Heavy electrical equipment should not be installed near to the weighing apparatus.
Incoming and Outgoing Signals	Relays and contacts connected to the equipment must have reliable and effective interference suppression. This also applies to other equipment within 3 meters of the equipment.

Declaration of Conformity

Non-Automatic Weighing Instrument (III)

Manufacturer	Vishay Transducers
Type/Model	VT 100
EC Type Approval Certificate Number	DK

Corresponds to the production model described in the EC Type Approval Certificate and to the requirements of the Council Directive 90/384/EEC as amended and to the requirements of the following EC Directives:

- EN 45501:1994, The Metrological Aspects of Non-Automatic Weighing Machines
- EN 55022:1987, Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment
- EN 60950:1992, Safety of Information Technology Equipment

Date	Jun 1, 2004
Signature	Benny Shaya, Director R&D/Operations Instruments Being the responsible person employed and appointed by Vishay Transducers.

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CHAPTER 1 INTRODUCTION

The VT 100 Weight Indicator is a single-channel digital weight indicator. The indicator front panel consists of six bright, 7-segment LED digits and a five-button keypad. The prominent features include:

- Four and six-wire load cell support connections
- OIML approved
- Two configurable digital inputs
- Electronic Data Processing Port (EDP) for full duplex, RS-232 communications at up to 9600 bps
- Printer port for output only RS-232 and 20 mA current loop communications at up to 9600 bps
- Available in 115 VAC and 230 VAC versions

1.1 Operating Modes

The VT 100 indicator has four modes of operation.

Mode	Description
Normal (Weighing Mode) - See Chapter 2 for more information.	Also known as weighing mode. The display shows measured weights in the units required.
Setup (Configuration) Mode - See Chapter 3 for more information.	Configuration mode allows users to modify parameter values and calibrate the indicator.
Test Mode - See Chapter 4 for more information.	Test mode performs diagnostic functions for the indicator.
Panel Mode - See Chapter 5 for more information.	Panel mode provides access to time, date, sequential numbering for print operations and the initial consecutive number value. This is all done without the need to press the “setup switch.”

1.2 Getting to Know the Indicator

1.2.1 Front View

The following figure shows the LED display and the five button keypad.

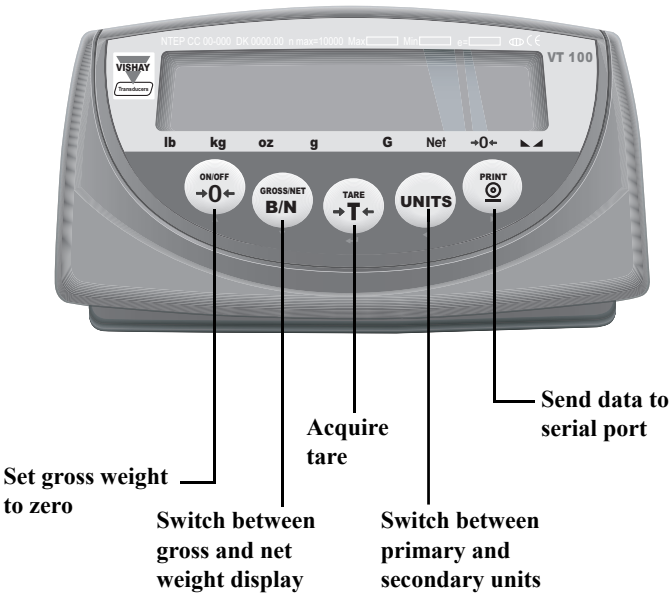


Figure 1–1: Front View

1.2.2 LED Annunciators

The VT 100 indicator uses a set of eight LED annunciators to provide additional information about the value being displayed.

- Gross (**G**) and Net (**Net**): Shows whether the displayed weight is a gross or net weight.
- Center of Zero (→0←):Gross weight is within 0.25 graduations of zero.
- No Motion (⏦): Scale is motionless or within the specified motion band. Some operations including tare function and printing can be done only when the no motion symbol is lit.
- Units (**kg**, and **g**): Indicate the units of the displayed value: kg=kilograms, and g=grams.

The displayed units can also be set to short tonnes (tn), metric tonnes (t) or NONE (no unit information is displayed). The kg and g LEDs function as primary and secondary unit annunciators for some combinations of primary and secondary units. If neither primary or secondary units are lb, kg, oz. or g, the lb annunciator is lit for primary units and kg for secondary units.

Note: In OIML approved applications, weighing is done in kg and g only.

1.2.3 Rear View

The rear view of the indicator is shown in the following figure:

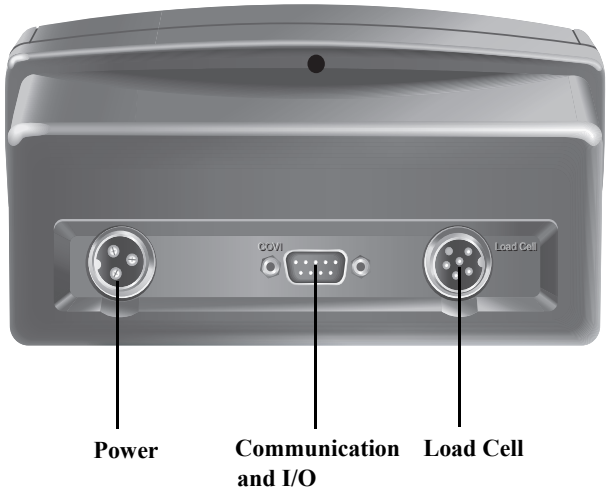


Figure 1–2: Rear View

1.2.4 Setup Switch

The following figure displays the setup switch location:

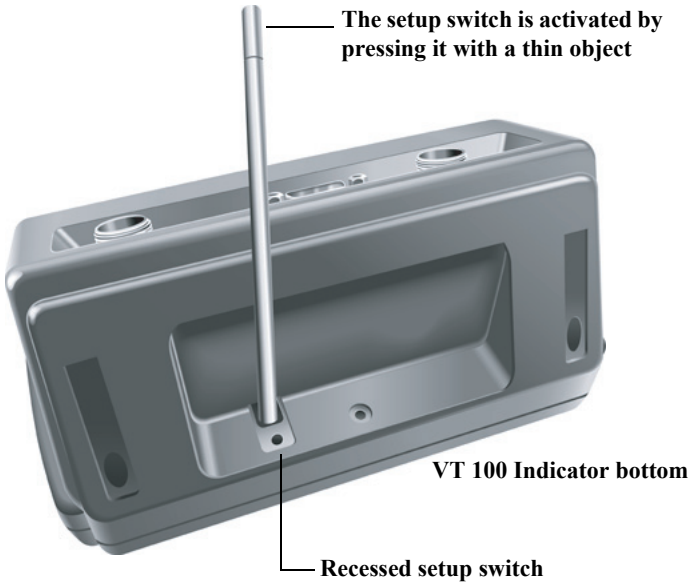


Figure 1–3: Setup Switch

The setup switch can only be activated by using a thin object to press it as shown in Figure 1-3.

The setup switch is used for entering configuration and calibration modes. In this mode, different parameters of the weight indicator can be configured and calibrated.

Note: This operation should be performed only by a qualified technician; calibration of the indicator may be disqualified if performed by anyone else. The indicator should always be sealed after initial configuration. Sealing materials can be non-reversible lead seals or stickers.

1.3 Indicator Operations

1.3.1 Weighing Mode Operations

The basic operations of the VT 100 are summarized below:

Toggle Gross/Net Mode

Press the GROSS/NET key to switch the display mode from gross to net or from net to gross. If a tare value has been entered or acquired, the net value is the gross weight minus the tare.

Gross mode is shown by the **Gross** annunciator, the net mode is shown by the **Net** annunciator.

Toggle Units

Press the UNITS key to switch between primary and secondary units. The units LED to the right of the display is lit.

Zero Scale

1. In gross mode, remove all weight from the scale and wait for the no motion annunciator (⏥).
2. Press the ZERO key. The center of zero (→0←) annunciator lights to indicate that the scale is zeroed.

Acquire Tare

1. Place container on scale and wait for the no motion annunciator (⏥).
2. Press the TARE key to acquire the tare weight of the container. The indicator switches to net mode.

Remove Stored Tare Value

1. Remove all weight from the scale and wait for the no motion annunciator (⏥).
2. Press the TARE key. The indicator switches to gross mode, indicating that the tare value has been removed.

Print Ticket

1. Wait for the no motion annunciator (⏥).
2. Press the PRINT key to send data to the serial port.

1.3.2 Front Panel Buttons

The front panel buttons are shown in the following table:

Button	Normal	Setup	Test
	Sets the gross weight to zero.	Functions as the up arrow button and is used to move one level up the menu hierarchy	Functions as the up arrow button and is used to move one level up the menu heirarchy.
	Switches between gross and net weight displays.	Functions as the down arrow button and is used to move one level down the menu hierarchy.	Functions as the down arrow button and is used to move one level down the menu heirarchy.
	Used to set tare load.	Functions as the ENTER button and is used to confirm selection.	Functions as the ENTER button and is used to confirm selection.
	Toggles the display between primary and secondary units.	Functions as the left arrow button and is used to select the menu item on the left at the same menu level.	Functions as the left arrow button and is used to select the menu item on the left at the same menu level.
	Sends data to the serial port.	Functions as the right arrow button and is used to select the menu item on the right at the same menu level.	Functions as the right arrow button and is used to select the menu item on the right at the same menu level.

CHAPTER 2 INSTALLATION

This section describes procedures for connecting the weight indicator to digital inputs and serial communication cables.

CAUTION

This weighing scale has no power switch. Turn off the power outlet or disconnect the power cord to turn off the weighing scale. The weighing scale must be installed near an easily accessible power outlet.

The various sockets on this weight indicator are shown in the following figure:

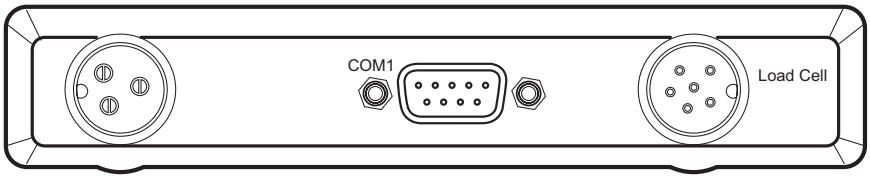
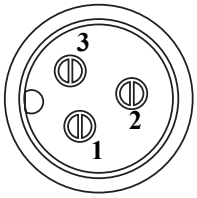


Figure 2–1: Cable Connections

2.1 Power Connector

The following table details the power connector pin function:

Pin	Designation	Function
3	+9V	Power Source
1	GND	Power Return



2.2 Serial/Print Connector and Digit Input

The following table details the serial pin connector functions:

Port	Pin	Designation	Function
EDP Port	3	EDP RX	RS232 receive data
	2	EDP TX	RS232 transmit data
	5	EDP GND	RS232 ground
Print Port	1	PR:TX	RS232 transmit data
	9	PR:20mA	+20mA OUT

The RS 232 EDP port connections are shown in the following figure:

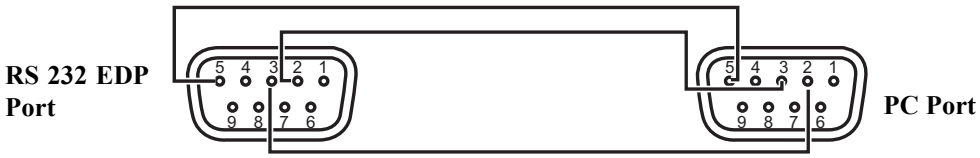


Figure 2–2: RS232 EDP Port Connections

Port	Pin	Designation	Function
VT 100 Port	5	EDP GND	RS232 ground
	3	EDP RX	RS232 receive data
	2	EDP TX	RS232 transmit data
PC Port	5	EDP GND	RS232 ground
	2	EDP TX	RS232 transmit data
	3	EDP RX	RS232 receive data

The VT 100 indicator provides two different serial output methods for the printer - either voltage or current.

2.3 Voltage Driven Printer

The details of the voltage driven printer output are shown in the following figure:

Figure 2–3: Voltage Driven Printer Output

2.4 Current Driven Printer (20 mA)

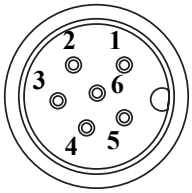
The details of the current driven printer output are shown in the following figure:

Figure 2–4: Current Driven Printer

2.5 Load Cell Connections

The following table shows the load cell connector pin functions.

Pin	Functions
PIN1	LOAD CELL SIGNAL +
PIN2	LOAD CELL EXCITATION +
PIN3	LOAD CELL SENSE +
PIN4	LOAD CELL EXCITATION -
PIN5	LOAD CELL SENSE -
PIN6	LOAD CELL SIGNAL -



See Figure *6-Wire Load Cell Application* on page 6 and *4-Wire Load Cell Application* on page 6.

Connections of a 6-Wire Load Cell Application

The relevant connections are shown in Figure 2–5:

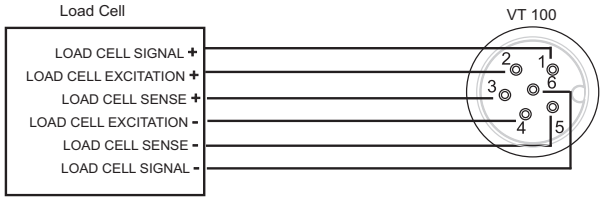


Figure 2–5: 6-Wire Load Cell Application

Connections of a 4-Wire Load Cell Application

The relevant connections are shown in Figure 2–6:

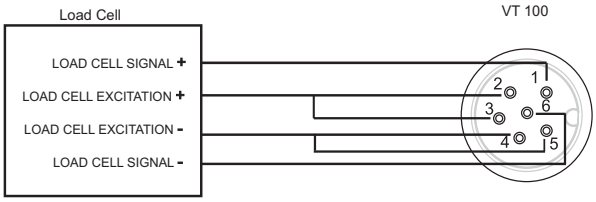
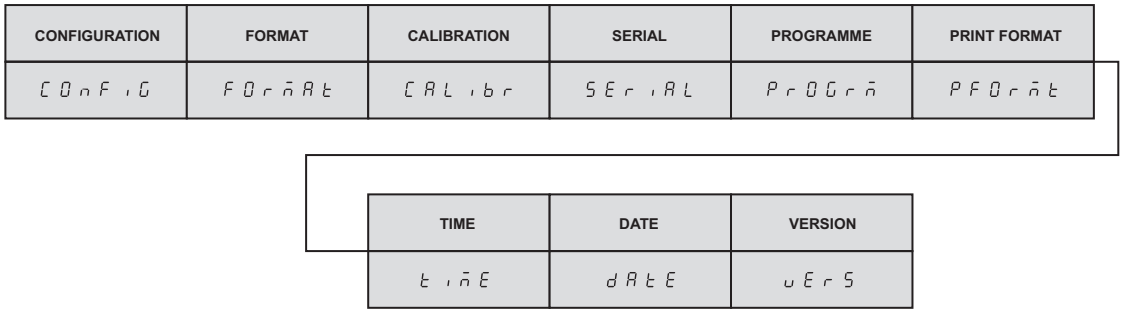


Figure 2–6: 4-Wire Load Cell Application

CHAPTER 3 CONFIGURATION MODE OPERATIONS

The following sections provide graphic representations of the indicator menu structures. The top level menu structure of the weight indicator is as follows:

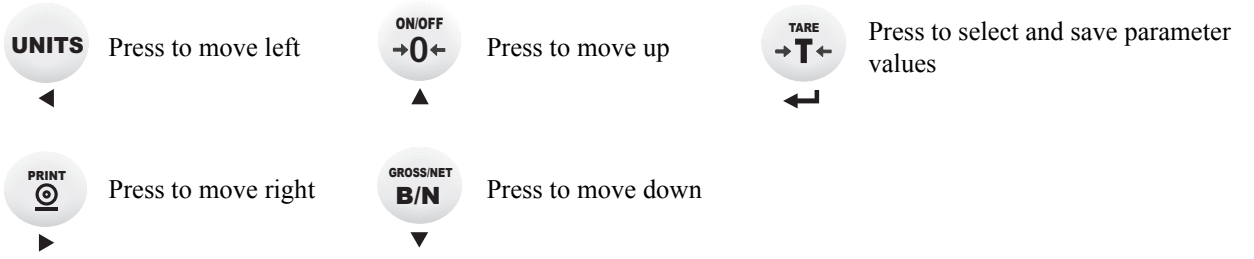


The following table gives a brief introduction to what each menu item does:

Table 3–1: Menu Structure

Main Menu	Function
CONFIGURATION Menu	Sets parameters affecting the weighing function: • ADC programmable-gain-amplifier value • Number of full scale graduations • Range within which the scale can be zeroed • Change in load at which the scale will exit the stable condition
FORMAT Menu	Sets the format for calculation and display of various units like: • Primary and secondary units • Multiplier exponent • Rate at which the display is refreshed
CALIBRATION Menu	Calibrates the indicator
SERIAL Menu	Configures the parameters of the serial port
PROGRAM Menu	Sets power-up mode, regulatory mode and consecutive number values
PRINT FORMAT Menu	Sets the print format used for gross and net tickets
TIME Menu	Sets the current time
DATE Menu	Sets the current date
VERSION Menu	Displays the installed software version number

The front panel buttons are used as directional buttons to navigate through the menus in setup mode.



A label under each of these buttons identifies the direction provided by the button as shown:

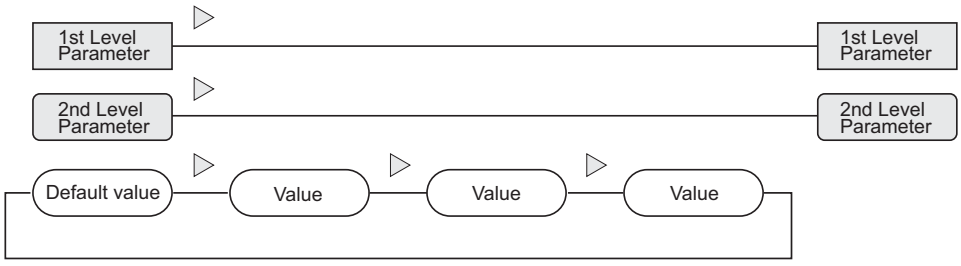


Figure 3–1: Navigating the Setup Menus

3.1 Configuration Menu

Use this mode to configure the parameters of the weighing scale. To configure items from this menu, press the setup switch. The configuration menu is shown below:

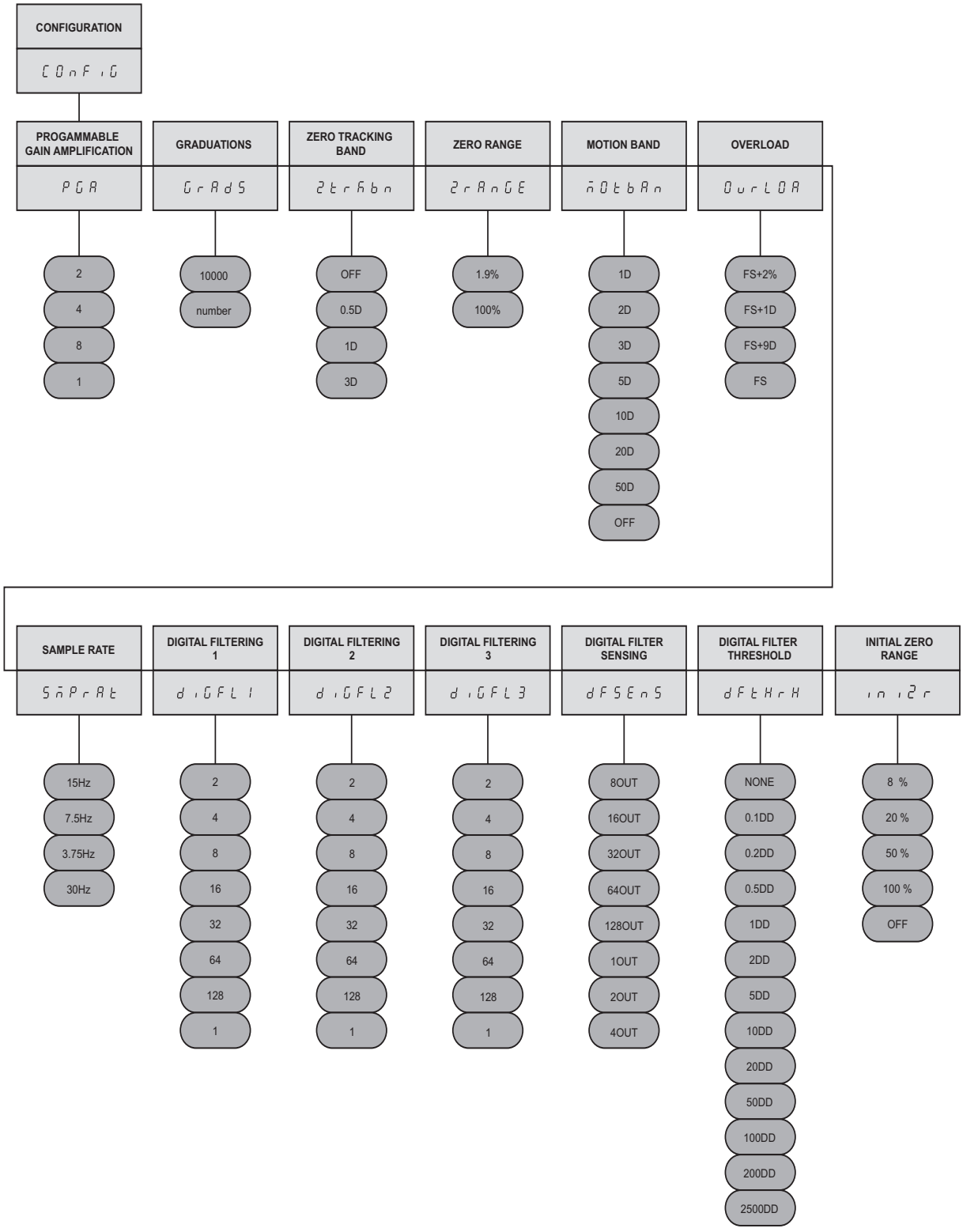


Figure 3–2: Configuration Menu

The following table describes the various configuration options (values in bold are default values):

Table 3–2: Configuration Options

Parameter	Options	Description
PROGRAMMABLE GAIN AMPLIFICATION PGA	1 **2** **4** **8**	Defines the ADC programmable-gain-amplifier value. -0.5mv/v to 4.5mv/v PGA=1 -0.2mv/v to 2.2mv/v PGA=2 -0.1mv/v to 1.1mv/v PGA=4 -0.05mv/v to 0.6mv/v PGA=8
GRADUATIONS GrAdS	**10000** Number	The value entered must be in the range 1 ~ 100000 and should be consistent with legal requirements and environmental limits on system resolution. To calculate GRADS, use the formula: Grads = Capacity/Display Division Display divisions for primary and secondary units are specified on the FORMAT menu.
ZERO TRACKING BAND ZtrAbn	**OFF** 0.5D 1D 3D.	This automatically zeros the scale when the input drifts slowly within the specified range and speed as defined by the parameter which covers the upper and lower limits. The maximum legal value is dependant on local regulations.
ZERO RANGE ZrAnGE	**100%** 1.9% OFF	This is the range within which the scale can be zeroed. For example, if this value is set to 1.9%, it means that the zero range is ±1.9% around the calibrated zero point, for a total range of 3.8%. The indicator must be in stable condition to zero the scale. Use 1.9% for legal-for-trade applications. 100% indicates the scale can be zeroed at any load.
MOTION BAND nOtbAn	**1D** 2D 3D 5D 10D 20D 50D OFF	Defines the change in load at which the scale will exit a stable condition (motion condition). If motion is not detected for more than 1 second, the stability annunciator lights. The motion band value must satisfy local regulations.
OVERLOAD OvrLOA	FS+1D FS+9D FS **FS+2D** (FS=full scale)	Defines the point of overload. The display indicates "------" when the point of overload is reached. The maximum legal value varies depending on legal regulations.
SAMPLE RATE SnPrAt	3.75 Hz 7.5 Hz **15 Hz** 30 Hz.	Defines the Analogue-to-Digital converter sampling rate. Lower sample rate values provide better signal noise immunity.
DIGITAL FILTER 1/2/3 diGFL1 diGFL2 diGFL3	1 **2** 4 8 16 32 64 128.	Defines the digital filtering rate used to reduce the effects of mechanical vibration. Choices indicate the number of A/D conversions that are averaged to obtain the displayed reading. A higher number gives a more stable display by minimizing the effect of a few noisy readings, but slows down the setting rate of the indicator.
DIGITAL FILTER CUTOUT SENSITIVITY dFSEnS	1 2 4 **8** 16 32 64 128.	Defines the number of consecutive readings that must fall outside the filter threshold (defined by DFTHRH) before digital filtering is suspended.
DIGITAL FILTER CUTOUT THRESHOLD dFtHrH	**NONE** 2DD 5DD 10DD 20DD 50DD 100DD 200DD 250DD.	Specifies the filter threshold in display divisions. When a specified number of consecutive scale readings (DFSENS parameter) fall outside this threshold, digital filtering is suspended. If NONE is selected, the filter is always enabled.
INITIAL ZERO RANGE inizr	**8%** 20% 50% 100% OFF	Defines the range within which the scale can be zeroed while power is on. Each range is a plus or minus value. For example, 8% means ± 8% around the calibrated zero point, for a total range of 16%.

3.2 Format Menu

The items in this menu are used to configure the format for calculation and display of various units. To configure items from this menu, enter configuration mode and then press the right arrow button once.

The Format menu is shown below:

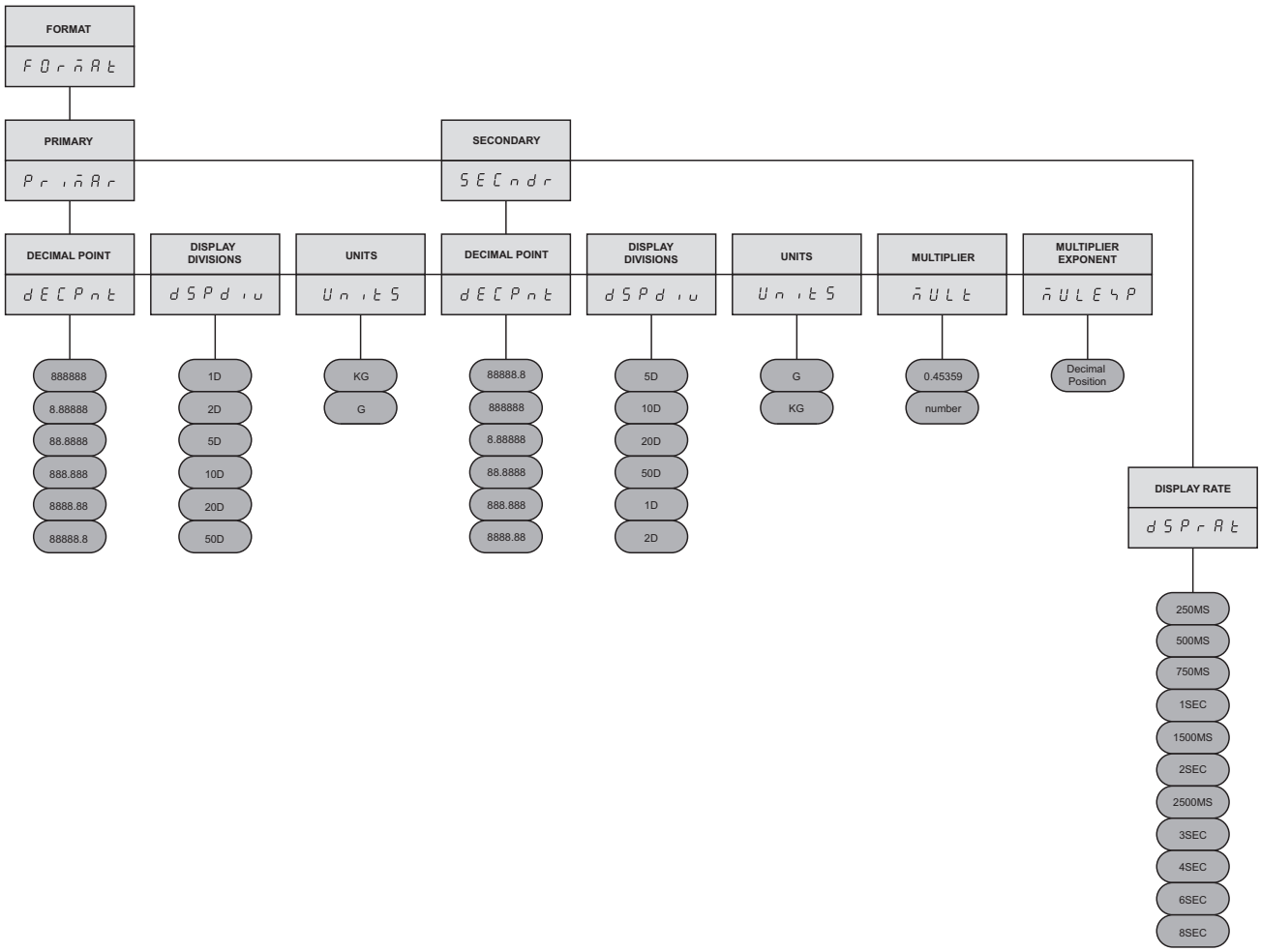


Figure 3–3: Format Menu

The following table describes the various format options (values in bold are default values):

Table 3–3: Format Options

Parameter	Options	Description
PRIMARY PrIMAr	DECPNT (DECIMAL POINT) DSPDIV (DISPLAY DIVISION) UNITS (UNITS)	Specifies the **Primary** decimal position, display divisions, and units used for the primary units.
DECIMAL POINT dECPnt	**888888** 88888.8 8888.88 888.888 88.8888 8.88888	**Decimal Point** defines the location of the decimal point or dummy zero for the primary unit display. The value set should be consistent with local legal requirements.
DISPLAY DIVISIONS dSPdiu	**1D** 2D 5D 10D 20D 50D	**Display Division** defines the minimum division size for the weight displayed by the primary units.
UNITS UnitS	**KG (KILOGRAM)** G (GRAM)	This defines the primary **Units** for display and printing.
SECONDARY SECndr	DECPNT (DECIMAL POINT) DSPDIV (DISPLAY DIVISION) UNITS (UNITS) MULT (MULTIPLIER) MULEXP (MULTIPLIER EXPONENT)	Specifies the **Secondary** decimal position, display divisions, and units used for the secondary units.
DECIMAL POINT dECPnt	**88888.8** 8888.88 888.888 88.8888 8.88888 888888	**Decimal Point Location** defines the location of the decimal point or dummy zero for the primary unit display. The value set should be consistent with local legal requirements.
DISPLAY DIVISIONS dSPdiu	1D 2D **5D** 10D 20D 50D	**Display Divisions** defines the minimum division size for the weight displayed by the secondary units.
UNITS UnitS	**G (GRAM)** KG (KILOGRAM)	This defines the secondary **Units** for display and printing.
MULTIPLIER MULt	**0.45359** Number	**Multiplier** defines the conversion factor by which the primary units are multiplied to obtain the secondary units. Secondary unit = Primary unit * MULT. Use the MULEXP parameter to shift the decimal position of the multiplier. To toggle between primary and secondary units, use the UNITS key.
MULTIPLIER EXPONENT MULEXP	DECIMAL POSITION	**Multiplier Exponent** specifies a divisor used to shift the decimal position in the secondary units multiplier value.
DISPLAY RATE dSPrAt	**250 MS** 500 MS 750 MS 1 SEC 1500 MS 2 SEC 2500 MS 3 SEC 4 SEC 6 SEC 8 SEC	**Display Rate** - sets the update rate for displayed values.

3.3 CALIBRATION

CAL ibr

3.3.1 Calibration Menu

This menu is used to calibrate the indicator. To configure items from this menu, enter configuration mode and then press the right arrow button twice.

CAL indicates that the machine is calibrating the selected value.

The Calibration menu is shown below:

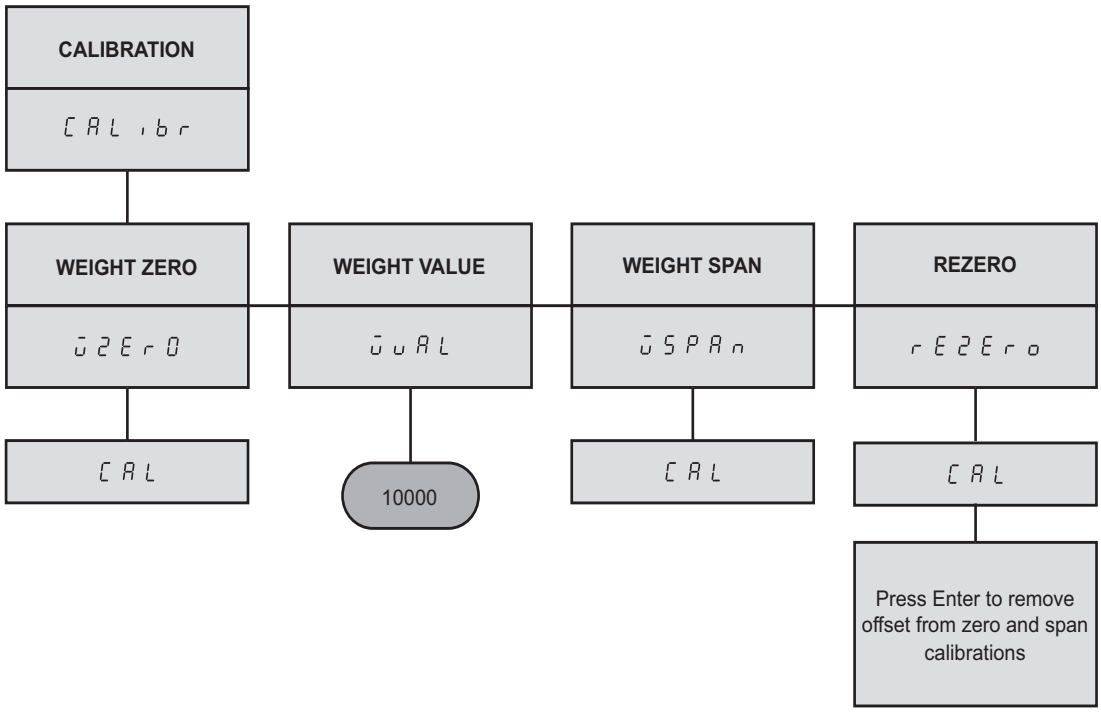


Figure 3–4: Calibration Menu

The following table describes the various calibration options (values in bold are default values).

Table 3–4: Calibration Options

Parameter	Options	Description
WEIGHT ZERO UZErO	NONE	
WEIGHT VALUE UUAL	**10000**	Displays and edits the test weight value.
WEIGHT SPAN USPAn	NONE	Displays span calibration weight value.
REZERO rEZEro	NONE	Removes an offset value from the zero and span calibrations. Use this setting only after WZERO and WSPAN have been set.

3.3.2 Calibrating VT 100

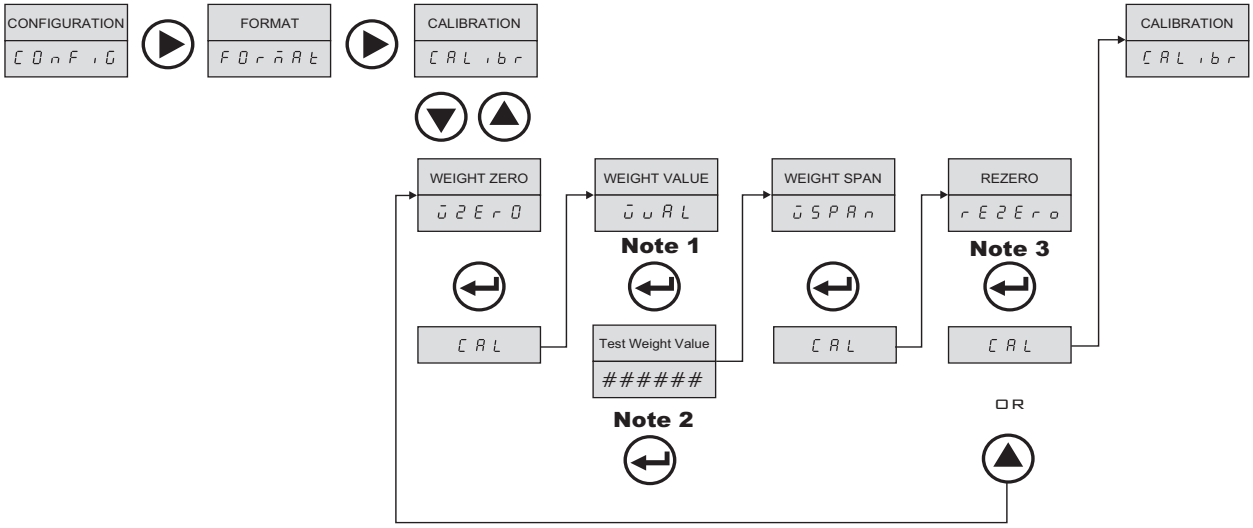
The VT 100 indicator can be calibrated using the front panel.

To calibrate the indicator, do the following:

1. Place the indicator in SETUP mode by pressing the push button in the back (See figure 1-3). The display reads "CONFIG." Remove all weight from the scale platform. If your test weights require hooks or chains, place the hooks or chains on the scale for zero calibration.
2. Press ▶ until the display reads "CALIBR." Press ▼ to navigate to zero calibration ("WZERO").
3. With "WZERO" displayed, press ↵ to calibrate zero. The indicator displays "CAL" while calibration is in progress. When complete, "WVAL" is displayed.
4. With "WVAL" displayed, place test weights on the scale and press ↵ to show the test weight value. Press ↵ again; the last digit of the displayed value flashes. Press ◀ or ▶ to change the digit selected. Press ▲ and ▼ to increment or decrement the value of the selected digit. Press ↵ to save the test weight value and navigate to span calibration ("WSPAN").
5. With "WSPAN" displayed, press ↵ to calibrate span. The indicator displays "CAL" while calibration is in progress. When complete, "REZERO" is displayed.
6. Optional: The rezero function is used to remove a calibration offset when hooks or chains are used to hang the test weights.
   - If no other apparatus was used to hang the test weights during calibration, remove the test weights and press ▲ to return to "CALIBR" menu.
   - If hooks or chains were used during calibration, remove these and all test weights from the scale. Press ↵ to rezero the scale. This function adjusts the zero and span calibration values. When complete "WZERO" is displayed. Press the ▲ button to return to "CALIBR" menu.
7. Press the ◀ button until the display reads "CONFIG", then press ▲ to exit setup mode.

Note: When editing numeric values, press ◀ or ▶ to change the digit selected. Press ▲ or ▼ button to increment or decrement the selected digit. Press ↵ to save the value entered and return to the level above. In case of a mistake, the whole process can be repeated to obtain proper calibration.

The calibration process is depicted in the following figure:



Note 1: Place test weights.

Note 2: Use arrow key, see figure 3-1 to set maximum weight value.

Note 3: Optional – use only when hooks or chains were used during calibration. To recalibrate zero, remove these and the test weights from the scale.

Figure 3–5: Calibration Process

3.4 SERIAL Menu

SEr iAL

The items in this menu are used to configure the serial port used for transferring data between the indicator and a PC or printer. To configure items in this menu, press the setup switch and then the right arrow button three times.

The Serial menu is shown below:

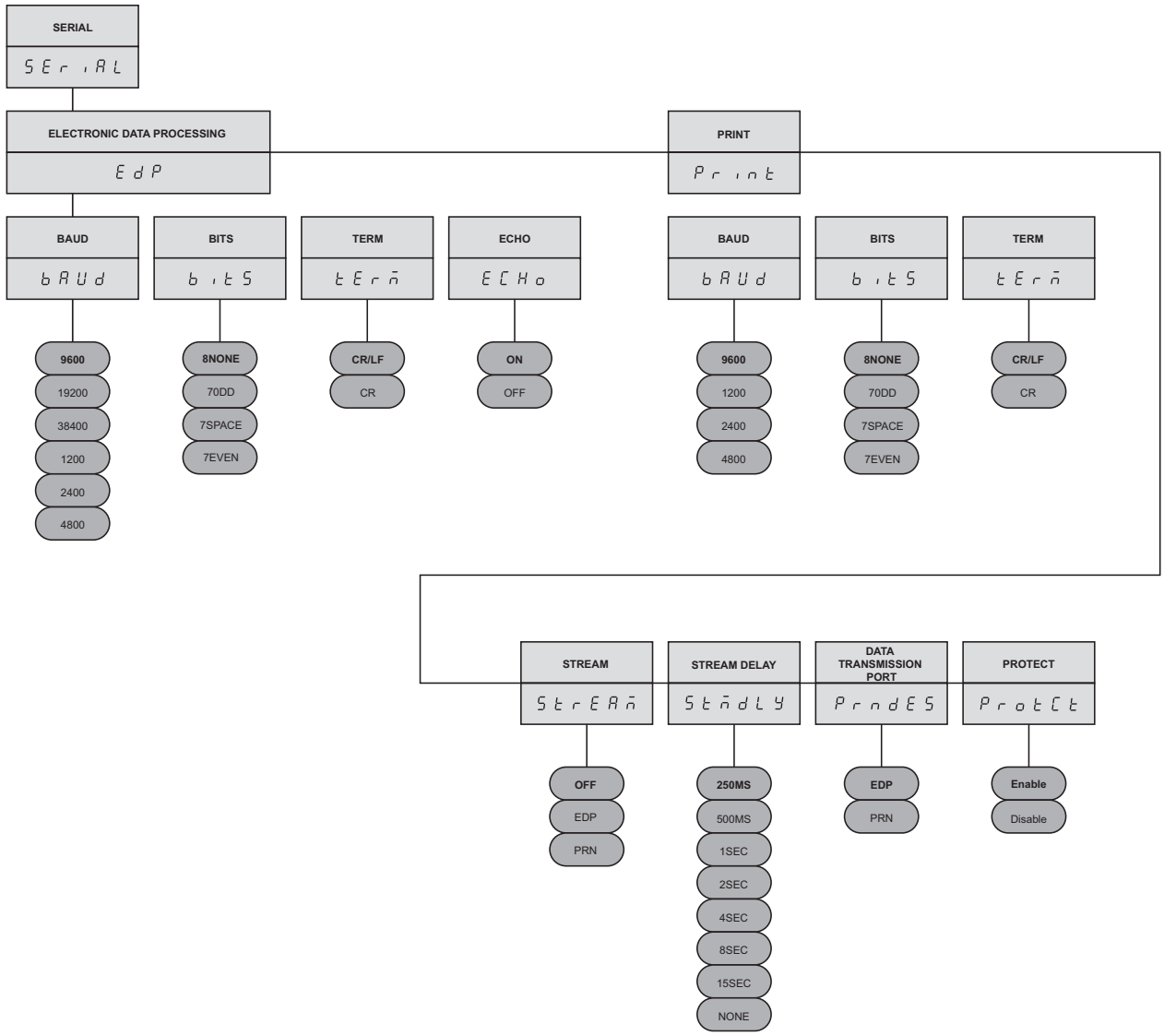


Figure 3–6: Serial Menu

The following table describes the various serial options (values in bold are default values).

Table 3–5: Serial Options

Parameter	Options	Description
ELECTRONIC DATA PROCESSING EdP	BAUD BITS TERM	Specifies port settings for baud rate, data bits, termination characters, and end-of-line delay used by the **EDP port**.
BAUD bAUd	**9600** 19200 38400 1200 2400 4800	**Baud Rate**. Selects the transmission speed for the EDP port.
BITS bitS	**8NONE** 7ODD 7EVEN 7SPACE	Selects number of data **bits** and parity of data transmitted from the EDP port.
TERMINATION tErn	**CR/LF** CR	Selects the **termination character** for data sent from the EDP port.
ECHO ECHo	**ON** OFF	Specifies whether commands sent to the indicator are **echoed**.
PRINT Print	BAUD BITS TERM	Specifies port settings for baud rate, data bits, termination characters, and end-of-line delay used by the **printer port**.
BAUD bAUd	**9600** 1200 2400 4800	**Baud Rate**. Selects the transmission speed for the printer port.
BITS bitS	**8NONE** 7ODD 7EVEN 7SPACE	Selects number of data **bits** and parity of data transmitted from the printer **port**.
TERMINATION tErn	**CR/LF** CR	Selects the **termination character** for data sent from the printer port.
SERIAL PORT StrEAn	**OFF** EDP PRN	Selects the **serial port** used for continuous transmission.
STREAM DELAY Stndly	**250MS** 500MS 1SEC 2SEC 4SEC 8SEC 15SEC NONE	Specifies the **delay** in seconds or milliseconds inserted between **stream frames.**
DATA TRANSMISSION PORT PrndES	**EDP** PRN	Selects the **port for data transmission** when the PRINT key is pressed or the KPRINT EDP command is set.
PROTECT ProtCt	**ENABLE** DISABLE	**EDP port protection**. Select ENABLE to secure the EDP port.

3.5 PROGRAM Menu

PrOGrm

Use this menu to configure the power-up mode, regulatory mode, and consecutive number values of this indicator.

The Program menu is shown below:

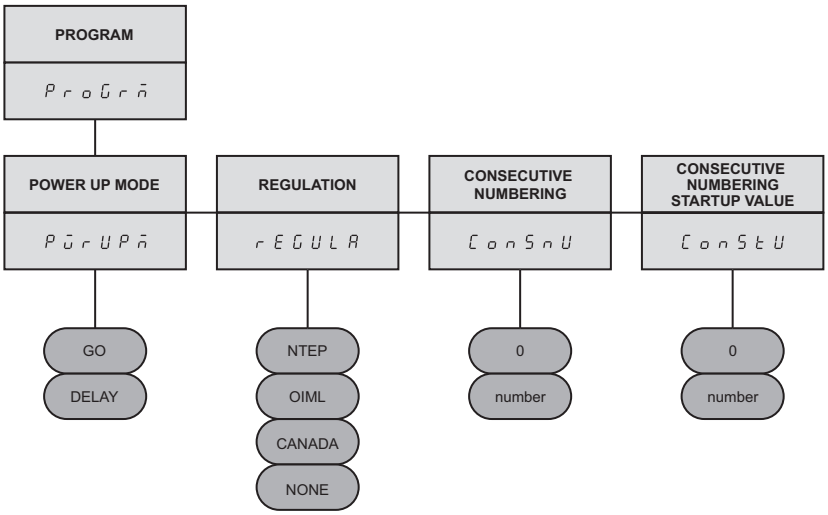


Figure 3–7: Program Menu

The following table describes the various program options (values in bold are default values).

Table 3–6: Program Options

Parameter	Options	Description
POWER UP MODE PUrUPm	**GO** DELAY	Power up mode. In GO mode, the indicator goes into operation immediately after a brief power up display test. In DELAY mode, the indicator performs the power up display test and enters a 60-second warm up period. Delay mode is terminated either at the end of the warm up period or when the predefined temperature is reached. If motion is not detected during the warm up period, it goes into Normal Mode.
REGULATION rEGULA	**NTEP** OIML CANADA NONE	Specifies the regulatory agency having jurisdiction over the scale site.
CONSECUTIVE NUMBERING ConSnU	**0** Number	Consecutive Numbering allows sequential numbering for print operations. This value is incremented following each print operation.
CONSECUTIVE NUMBERING STARTUP VALUE ConStU	**0** Number	Consecutive Number Startup Value specifies the initial consecutive number (CONSNU) value used when the indicator is powered on.

3.6 PRINT FORMAT Menu

PFornt

Use these menu options to configure the print format settings.

The Print Format menu is shown below:

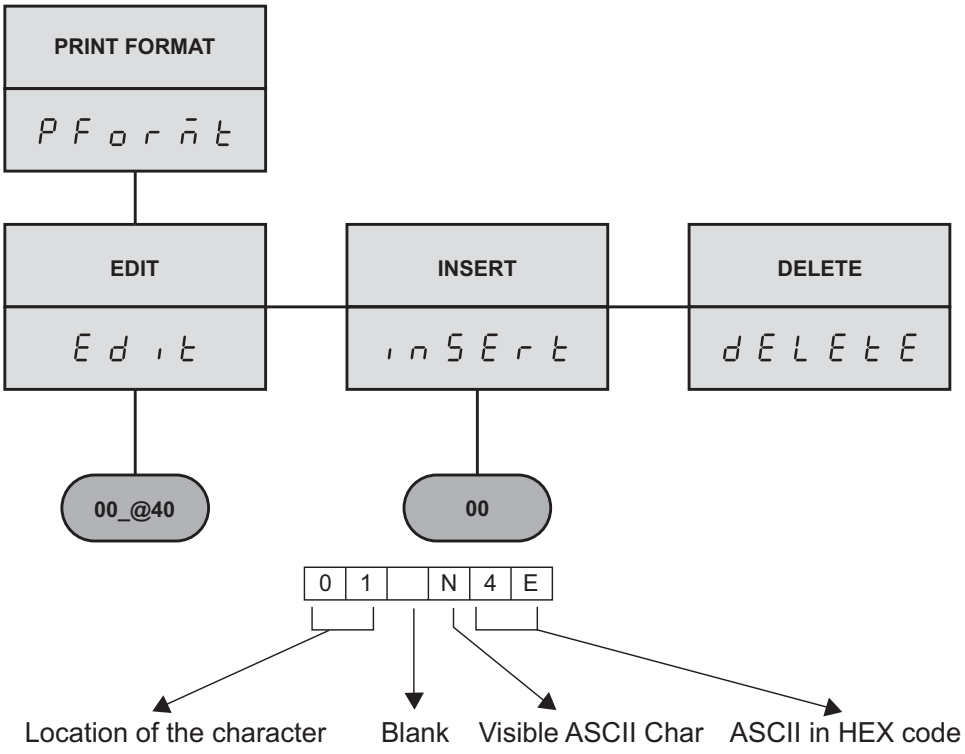


Figure 3–8: Print Format Menu

The following table describes the various print format options.

Table 3–7: Print Format Options

Parameter	Options	Description
EDIT Edit	NONE	Edits the print format.
INSERT inSErt	NONE	Inserts a new character initialized to 00, at the end of the value edited using the previous EDIT option. This shifts all data after it to the right by one position. After insertion, the user can edit the value.
DELETE dELEtE	NONE	Deletes the last character of the value edited by the previous EDIT option. This shifts all data after it to the left by one position.

3.7 TIME Menu

Use these menu options to configure time settings.

The Time menu is shown below:

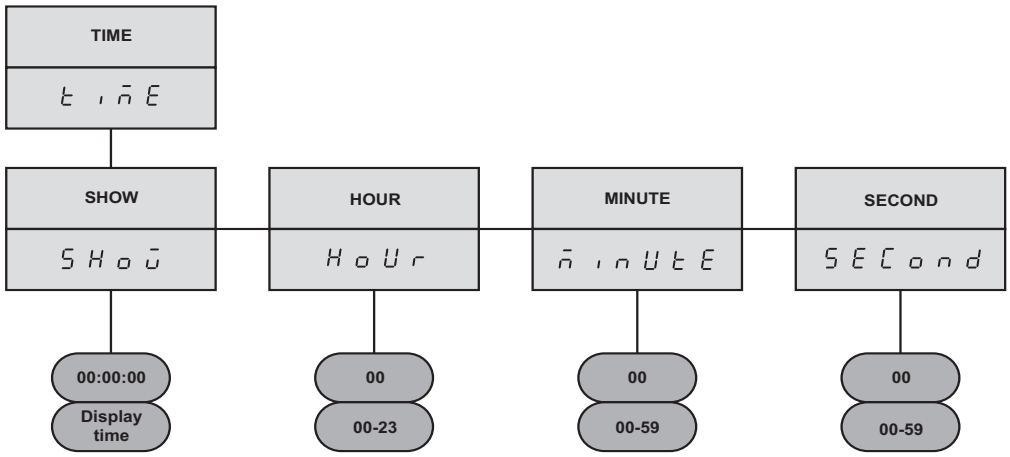


Figure 3–9: Time Menu

The following table describes the various time options.

Table 3–8: Time Options

Parameter	Options	Description
SHOW	HH.MM.SS	Displays current time in HH:MM:SS format
HOUR	hour (HH)	Set hour using 24 hour format
MINUTE	minute (MM)	Set minute
SECOND	second (SS)	Set second

3.8 DATE Menu

dAtE

Use these menu options to configure date settings.

The Date menu is shown below:

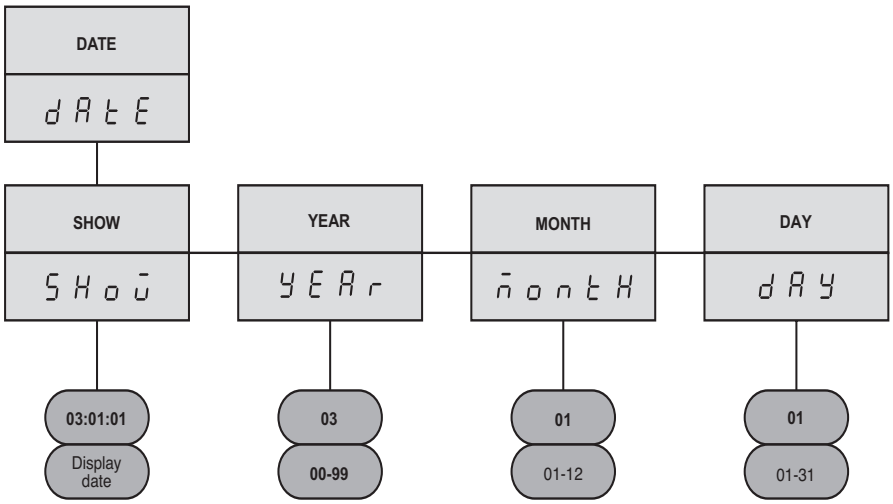


Figure 3–10: Date Menu

The following table describes the various date options.

Table 3–9: Date Options

Parameter	Options	Description
SHOW SHoū	YY.MM.DD	Displays current date in YY.MM.DD format
YEAR yEAr	year (YY)	Set year (two digits 00-99)
MONTH ñonth	month (MM)	Set month.
DAY dAy	day (DD)	Set day.

3.9 VERSION Menu

uEr S

This shows the software version of this indicator.

The Version menu is shown below:

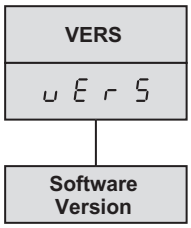


Figure 3–11: Version Menus

TEST MODE OPERATIONS

A/DTST

Use this mode to test the parameters of the weight indicator.

Note: This operation is approved, only if performed by a certified technician.

To enter test mode, press the “setup switch” for three seconds. The display will change from CONFIG to A/DTST.

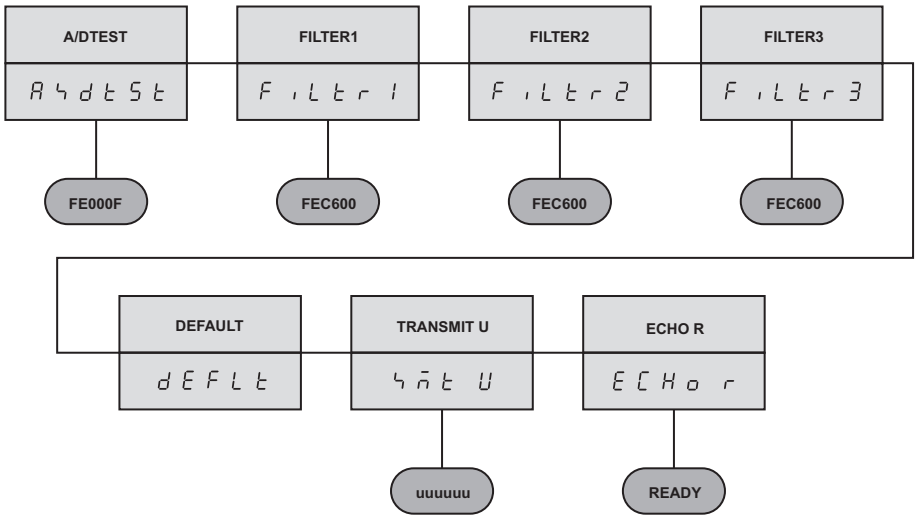
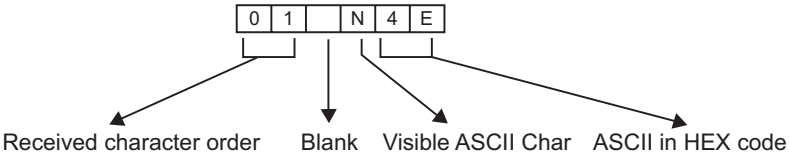


Figure 4–1: Test Mode Operations

Parameter	Description
A/DTEST A/DTST	Display A/D Test. Press and hold the Enter button to display the raw count value from A/D converter.
FILTER1 FILTR1 FILTER2 FILTR2 FILTER3 FILTR3	Display filtered raw count for digital filters 1~3. Press and hold the Enter button to show the status of DIGIN1 (DI1=HI or DI1=LO). Press and hold the Enter button to show the status of DIGIN2 (DI2=HI or DI2=LO). Press and hold the Enter button to show the status of DIGIN3 (DI3=HI or DI3=LO).
DEFAULT DEFLT	Default parameters. Press the setup switch and the Enter button at the same time to reset configuration and calibration parameters to factory default values.
TRANSMIT U SNT U	Transmit “U”. Press and hold the Enter button to send the U character [ASCII: 85 decimal, 55 hex] to test the serial line quality and integrity.
ECHO R ECHO R	This displays the character received from the serial port to test the serial line quality. Press the down arrow once until the indicator displays “READY”. Now, press the enter button on the front panel. This displays the value received from serial port on the front panel. The format of the data displayed by the ECHO R command is shown as shown: 

PANEL MODE OPERATIONS

Panel mode provides access to setting the time, date, and print serial numbers operation without the need to press the "Setup Switch".

To enter Panel Mode, under normal mode press the "GROSS/NET" button for three seconds. The Panel Mode's TIME menu is displayed.

The pictorial representation of the panel menu is as follows:

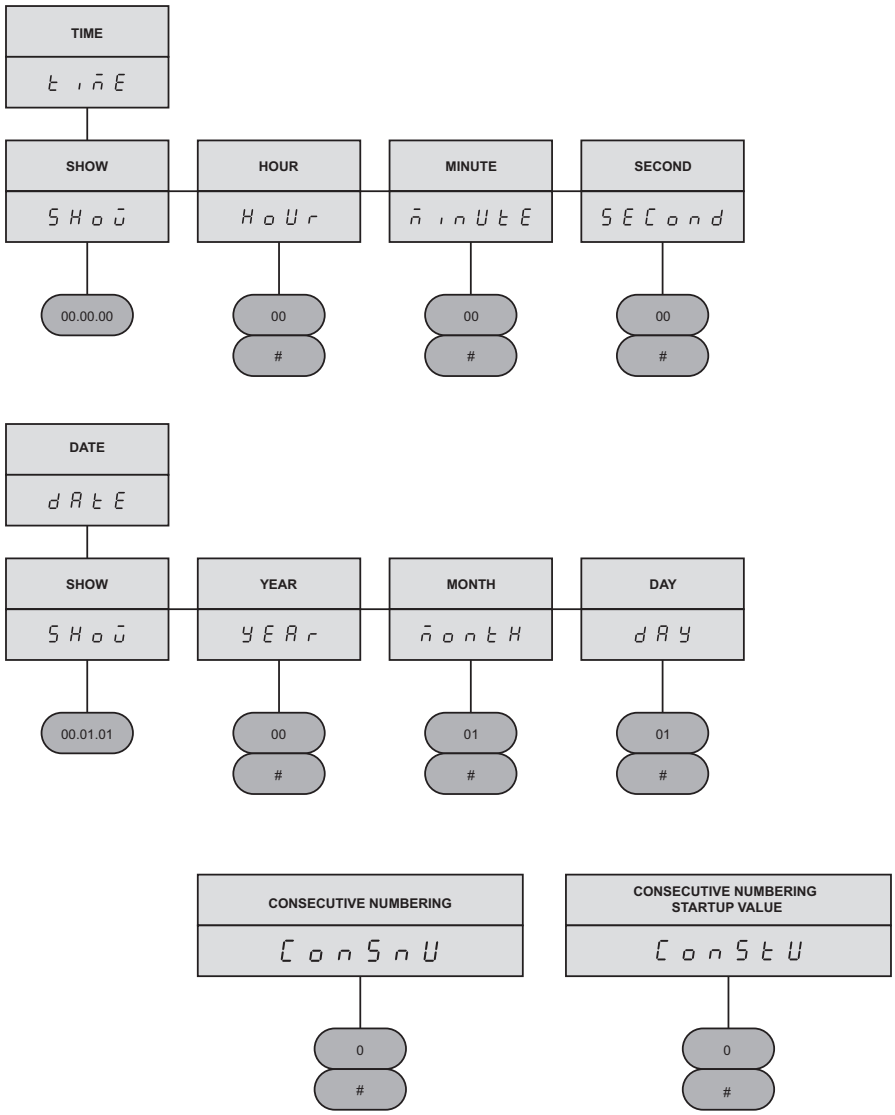


Figure 5–1:Panel Mode Operations

Table 5–1: Panel Options

Parameter	Options	Description
Time tIME	—	Set the time.
SHOW SHOW	HH.MM.SS	Displays current time in HH:MM:SS format.
HOUR HOUr	hour (HH)	Set hour using 24 hour format.
MINUTE MInUtE	minute (MM)	Set minute.
SECOND SECond	second (SS)	Set second.
DATE dAtE	—	Set the date.
SHOW SHOW	YY.MM.DD	Displays current date in YY.MM.DD format.
YEAR yEAr	year (YY)	Set year (two digits 00-99)
MONTH MontH	month (MM)	Set month.
DAY dAY	day (DD)	Set day.
CONSECUTIVE NUMBERING ConSnU	**0** Number	Consecutive Numbering that allows sequential numbering for print operations. This value is incremented following each print operation.
CONSECUTIVE NUMBERING STARTUP VALUE ConStU	**0** Number	Consecutive Number Startup Value that specifies the initial consecutive number (CONSNU) value used when the indicator is powered on.

CHAPTER 6 PRINT FORMATS

6.1 Print Format Commands

The following table gives the possible indicator parameters and command values that may be printed.

Command	Description
@G	Gross weight in displayed units. This also displays the weight units used.
@T	Tare weight in displayed units.
@N	Net weight in displayed units.
@C	Print consecutive number.
@Ln	New line, n specifies termination number.
@t	Time
@d	Date
@Sn	Space, n specifies the number of spaces.
@M	Use in pairs to quote Tare and Net data. If Tare is present, then the Tare and Net data will be printed on the ticket.
Gross, Net and Tare weights are 9 digits in length, including sign (10 digits with decimal point), followed by a space and a two-digit units identifier. The total field length with units identifier is 12 (or 13) characters.	
ID and consecutive number (CN) fields are 1-6 characters in length, as required.	

This section describes setting the print formats for the indicator, using the serial port or the front panel. There are two methods to edit the print format.

6.2 Edit Using Any Editor Through EDP

Write the print format data in pure text format. The following samples are for an Eltron LP 2742 printer.

Wwpf = 0
N
A0,0,0,3,1,2,N,"Vishay Transducers Ltd. @d @t @C" A8,50,0,5,1,1,N,"@G"
@MA8,120,0,5,1,1,N,"@T"
A8,190,0,5,1,1,N,"@N"@M
B8,260,0,3,3,7,100,B,"@G"
P1

First, place a “WWPF=0” in the first line to indicate that the following is a print format file. Place printer parameters in the beginning of each line as required, and then use double quotes to contain the text that you want to print on the ticket.

Note in the above example, N, AxxxxN, B, and P1 are printer specific parameters for the Eltron LP 2742.

ASCII characters in HEX mode:

wpf=0
4E 0D 41 30 2C 30 2C 30 2C 33 2C 31 2C 32 2C 4E 2C 22 43 65 6C 74 72 6F 6E 20 54 65 63 68 6E 6F 6C 6F 67 69 65 73 20 49 6E 63 2E 20 40 64 20 40 74 20 40 43 22 0D 41 38 2C 35 30 2C 30 2C 35 2C 31 2C 31 2C 4E 2C 22 40 47 22 0D 40 4D 41 38 2C 31 32 30 2C 30 2C 35 2C 31 2C 31 2C 4E 2C 22 40 54 22 0D 41 38 2C 31 39 30 2C 30 2C 35 2C 31 2C 31 2C 4E 2C 22 40 4E 22 40 4D 0D 42 38 2C 32 36 30 2C 30 2C 33 2C 33 2C 37 2C 31 30 30 2C 42 2C 22 40 47 22 0D 50 31 0D

First, place “WPF=0” in the first line to indicate that the following is a print format file. Then place each character in ASCII HEX format and include a 0D for carriage return.

6.3 Use Front Panel Editing

The format of the characters to be entered is shown.

Note: EDP or Electronic Data Processing refers to a PC or a terminal that can enter ASCII characters using a keyboard and a screen via the EDP interface of the VT 100.

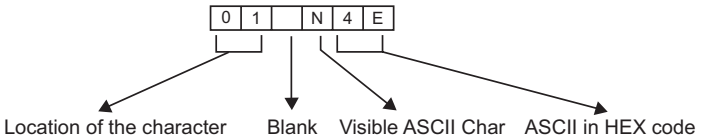


Figure 6–1: Print Format

APPENDIX A ELECTRONIC DATA PROCESSING COMMANDS

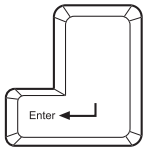
The EDP port and commands may be used to set indicator parameters, retrieve indicator parameters, and set print formats.

To set parameter values, enter the corresponding EDP commands from the terminal. In order to set the parameter values, use the following format:

"Command=Parameter Value"

For example: To set GRADS (graduations) to 5000, do the following:

grads=5000 (Press "Enter" on the keyboard)



OK

OK: Indicates the setting has been saved.

To retrieve parameter values, send the parameter name followed by "=" in ASCII code to the indicator.

For example: To retrieve the GRADS (graduations) value, do the following:

grads= (Press "Enter" on the keyboard)

5000.

The value of GRADS is returned as 5000.

A.1 GENERAL Commands

Table A–1: General Commands

Command	Function
DUMPALL	List all parameter values
VERSION	Show VT 100 software version "VT 100 Vx.xxx"
P	Show currently displayed weight with unit

A.2 CONFIGURATION Commands

Table A–2: CONFIG Commands

Command	Description	Values
PGA	ADC PGA	1, 2, 4, and 8
GRADS	Graduations	1 - 10000
ZTRKBND	Zero Track Band	OFF, 0.5D, 1D, and 3D
ZRANGE	Zero Range	1.9%, 100%
MOTBAND	Motion Band	OFF, 1D, 3D, 5D, 10D, 20D, and 50D
OVRLOAD	Over Load	FS+2%, FS+1D, FS+9D, and FS
SMPRAT	Sample Rate	3.75Hz, 7.5Hz, 15Hz, and 30Hz
DIGFLTR 1 DIGFLTR 2 DIGFLTR 3	Digital Filter 1 ~ 3	1, 2, 4, 8, 16, 32, 64, and 128
DFSENS	Digital Filter Cutout Sensitivity	1out, 2out, 4out, 8out, 16out, 32out, 64out, and 128out
DFTHRH	Digital Filter Cutout Threshold	NONE, 0.1DD, 0.2DD, 0.5DD, 1DD, 2DD, 5DD, 10DD, 20DD, 50DD, 100DD, 200DD, and 250DD
WVAL	Full scale value	1 - 999999

A.3 FORMAT Commands

Table A–3: FORMAT Commands

Command	Description	Values
PRI.DECPNT	Primary units decimal point position	888888, 8.88888, 88.8888, 888.888, 8888.88, and 88888.8
PRI.DSPDIV	Primary units display division	1D, 2D, 5D, 10D, 20D, and 50D
PRI.UNITS	Primary units	KG, G
SEC.DECPNT	Secondary units decimal point position	888888, 8.88888, 88.8888, 888.888, 8888.88, and 88888.8
SEC.DSPDIV	Secondary units display division	1D, 2D, 5D, 10D, 20D, and 50D
SEC.UNITS	Secondary units	G, KG
SEC.MULT	Secondary multiplier	0.45359
DSPRAT	Display Rate	2500 ms, 500 ms, 750 ms, 1 sec, 1500 ms, 2 sec, 2500 ms, 3 sec, 4 sec, 6 sec, and 8 sec

A.4 PROGRAM Commands

Table A–4: PROGRM Commands

Command	Description	Values
PWRUPMD	Power up mode	GO, DELAY
REGULAT	Regulatory Compliance	NTEP, OIML, CANADA, NONE
CONSNUM	Consecutive number	0 - 999999
CONSTUP	Consecutive number start-up value	0 - 999999

A.5 SERIAL Commands

Table A–5: SERIAL Commands

Command	Description	Values
EDP.BAUD	EDP port baud rate	300, 600, 1200, 2400, 4800, 9600, 19200, 38400
EDP.BITS	EDP port data bits/parity	8NONE, 7EVEN, 7ODD, and 7SPACE
EDP.TERMIN	EDP port termination character	CR/LF, CR
PRN.BAUD	Printer port baud rate	110, 300, 600, 1200, 2400, 4800, and 9600
PRN.BITS	Printer port data bits/parity	8NONE, 7EVEN, 7ODD, 7SPACE
PRN.TERMIN	Printer port termination character	CR/LF, CR
STREAM	Streaming port	OFF, EDP, PRN
STMDLY	Stream output delay period	250 ms, 500 ms, 1 sec, 2 sec, 4 sec, 8 sec, 15 sec, and None
PRNDEST	Print destination	PRN, EDP
PROTCT	Protection	DISABLE, ENABLE

A.6 REGULATION

REGULATION sets the tare mode and the tare and zero commands affect the indicator operation, according to a selected weighing machine standard (NTEP, OIML, CANADA, NONE).

Note: ZERO is active if the weight is within the Zero Range.

Table A–6: REGULATION

REGULAT	Weight on Scale	Tare in System	Press TARE button	Press ZERO button
NTEP	No load	no	no action	ZERO
		yes	CLEAR TARE	
	positive	no	TARE	
		yes		
OIML	No load	no	no action	ZERO
		yes	CLEAR TARE	ZERO and CLEAR TARE
	positive	no	TARE	ZERO
		yes		ZERO and CLEAR TARE if weight is within ZRANGE. No action if weight is outside the ZRANGE.
CANADA	No load	no	no action	ZERO
		yes	CLEAR TARE	ZERO and CLEAR TARE if weight is within ZRANGE. No action if weight is outside the ZRANGE.
	positive	no	TARE	ZERO
		yes	no action	ZERO
NONE	No load	no	no action	ZERO
		yes	CLEAR TARE	
	positive	no	TARE	
		yes	CLEAR TARE	

A.7 PRINT FORMAT Commands

Table A–7: PFORMT Commands

Command	Description	Values
WWPF	Print format strings in visible ASCII characters	See “Print Formats” on page 24.
WPF	Print format strings in ASCII Hex code	See “Print Formats” on page 24.

A.8 RESET Commands

Table A–8: RESET Commands

Command	Description	Values
DEFLT	Reset Default parameter values	—

A.9 A/D Commands

Table A–9: ADS 1240 Commands

Command	Description	Values
ADS	Display Current 16 Registers of the ADC	—
ADSRESET	ADC reset	—
ADSSELFCAL	ADC self calibrate	—

A.10 Key Button on EDP Commands

Table A–10: Key Button

Command	Description	Values
KGROSSNET	Same function as press Gross/Net Button	—
KZERO	Same function as press Zero Button	—
KTARE	Same function as press Tare Button	—
KUNITS	Same function as press Units Button	—
KPRINT	Same function as press Print Button	—

A.11 Other Commands

Table A–11: Other Commands

Command	Description	Values
EE	Read EEPROM Contents	—
REZERO	Calibrate Rezero	—
WZERO	Calibrate Zero	—
WSPAN	Calibrate Span	—
RS	Software Reset	—
SFR	Read CPU’s SFR Contents	—
IO	Read IO 4 Ports status	—
CONFIG	Enter Configure mode	—
TEST	Enter Test Mode	—
SETUP	Enter Setup Mode	—
CLREE	Clear all EEPROM data. (Note: all data is lost)	—

APPENDIX B CONVERSION FACTORS AND CONTINUOUS OUTPUT FORMAT

Conversion Factors

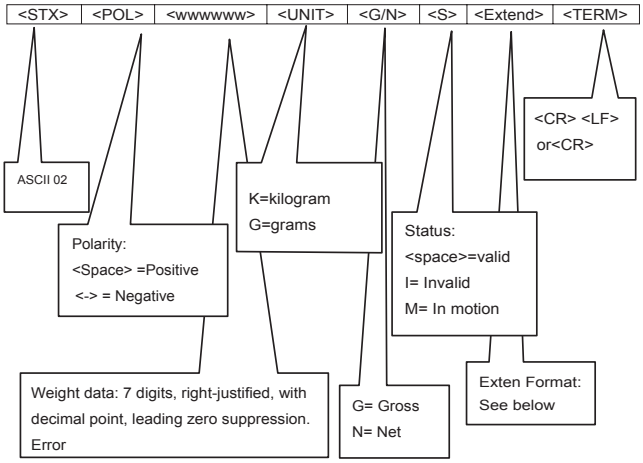
Secondary Unit = Primary Unit x Multiplier

Table B–1: Conversion Factors

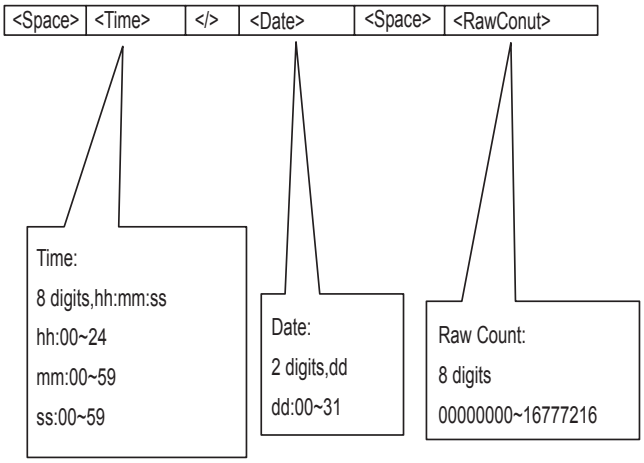
Primary Unit	X Multiplier	Secondary Unit
grams	15.4324	grains
	0.03527	ounces
	0.00221	pounds
	000.001	kilograms
kilograms	15432.4	grains
	035.274	ounces
	001000	grams
	2.20462	pounds
	00.0011	metric tonnes

COS Format

Note: All values are ASCII code characters.



Extended Format



APPENDIX C ASCII SET AND SPECIFICATIONS

ASCII Character Set

Use the decimal values for ASCII characters listed in the table, when specifying print format strings on the VT 100 PFORMT menu. The actual character printed depends on the character mapping used by the output device. The VT 100 can send and receive any ASCII character value (decimal 0-255) but the indicator display is limited to numbers, upper-case, unaccented letters, and a few special characters.

Table D–1: Control Characters 0 ~ 31

Control	ASCII	Dec	Hex	Control	ASCII	Dec	Hex
Ctrl-@	NUL	00	00	Ctrl-P	DLE	16	10
Ctrl-A	SOH	01	01	Ctrl-Q	DC1	17	11
Ctrl-B	STX	02	02	Ctrl-R	DC2	18	12
Ctrl-C	ETX	03	03	Ctrl-S	DC3	19	13
Ctrl-D	EOT	04	04	Ctrl-T	DC4	20	14
Ctrl-E	ENQ	05	05	Ctrl-U	NAK	21	15
Ctrl-F	ACK	06	06	Ctrl-V	SYN	22	16
Ctrl-G	BEL	07	07	Ctrl-W	ETB	23	17
Ctrl-H	BS	08	08	Ctrl-X	CAN	24	18
Ctrl-I	HT	09	09	Ctrl-Y	EM	25	19
Ctrl-J	LF	10	0A	Ctrl-Z	SUB	26	1A
Ctrl-K	VT	11	0B	Ctrl-[	ESC	27	1B
Ctrl-L	FF	12	0C	Ctrl-\	FS	28	1C
Ctrl-M	CR	13	0D	Ctrl-]	GS	29	1D
Ctrl-N	SO	14	OE	Ctrl-^	RS	30	1E
Ctrl-O	SI	15	OF	Ctrl-_	US	31	1F

Table D–2: Characters 32 ~ 63

ASCII	Dec	Hex	ASCII	Dec	Hex
SPACE	32	20	0	48	30
!	33	21	1	49	31
“	34	22	2	50	32
#	35	23	3	51	33
$	36	24	4	52	34
%	37	25	5	53	35
&	38	26	6	54	36
‘	39	27	7	55	37
(	40	28	8	56	38
)	41	29	9	57	39
*	42	2A	:	58	3A
+	43	2B	;	59	3B
,	44	2C	<	60	3C
-	45	2D	=	61	3D
.	46	2E	>	62	3E
/	47	2F	?	63	3F

Table D–3: Characters 64 ~ 95

ASCII	Dec	Hex	ASCII	Dec	Hex
@	64	40	P	80	50
A	65	41	Q	81	51
B	66	42	R	82	52
C	67	43	S	83	53
D	68	44	T	84	54
E	69	45	U	85	55
F	70	46	V	86	56
G	71	47	W	87	57
H	72	48	X	88	58
I	73	49	Y	89	59
J	74	4A	Z	90	5A
K	75	4B	[	91	5B
L	76	4C	\	92	5C
M	77	4D	]	93	5D
N	78	4E	^	94	5E
O	79	4F	_	95	5F

Table D–4: Characters 96 ~ 127

ASCII	Dec	Hex	ASCII	Dec	Hex
‘	96	60	p	112	70
a	97	61	q	113	71
b	98	62	r	114	72
c	99	63	s	115	73
d	100	64	t	116	74
e	101	65	u	117	75
f	102	66	v	118	76
g	103	67	w	119	77
h	104	68	x	120	78
i	105	69	y	121	79
j	106	6A	z	122	7A
k	107	6B	{	123	7A
l	108	6C	|	124	7C
m	109	6D	}	125	7D
n	110	6E	~	126	7E
o	111	6F	DEL	127	7F

APPENDIX D ERROR MESSAGES

Error Message Table

The VT100 indicator displays a number of error messages. When an error occurs, the message is shown on the indicator LED display.

Table E–1: Error Messages

Error Message	Description	Solution
- - - - - -	Gross > Overload limit	Gross value exceeds overload limit. Check configuration or signal input level.
– – – – – –	Underflow error	Weight value too small to be displayed
~ ~ ~ ~ ~ ~	Overflow error	Weight value too large to be displayed
AD LOW	A/D over negative range	Check scale for binding or damage
AD HI	A/D over positive range	Check scale for binding or damage
EE SUM	Parameter or calibration check-sum error	Recalibration is needed; contact Vishay service
EE WR	EEPROM write error	Contact Vishay service
PM SUM	Internal program checksum error	Contact Vishay service
HOFSET	Load > calibrated zero + capacity x INIZR	Check weight and INIZR
LOFSET	Load < calibrated zero + capacity x INIZR	Check weight and INIZR
UOFSET	Unstable within 2 sec of power-ing on	Check weight and INIZR
ERR xx	Other error, where xx is one of the following hex codes: • b7 – Program Memory check sum error • b6 – EEPROM write error • b5 – EEPROM check sum error • b4b3b2b1b0: 1 Raw A/D 0000000h 2 Raw A/D 0ffffffh 3 overload limited 4 under -99999 5 over 999999 6 initial high offset 7 initial low offset 8 initial unstill	

APPENDIX E FRONT PANEL DISPLAY CHARACTERS

Character Map for Front Panel Display

The following figure shows the 7-segment LED character set used to display alphanumeric characters on the VT 100 front panel.

	-	9	E	Q
	.	:	F	R
	/	;	G	S
	0	<	H	T
%	1	=	I	U
&	2	>	J	V
'	3	?	K	W
(	4	@	L	X
)	5	A	M	Y
*	6	B	N	Z
+	7	C	O	[
,	8	D	P	\

Figure A–1: VT 100 Display Characters

VT-100 Detailed Specifications

The following are the specifications of this product.

Performance

Resolution: 10,000 or 100,000 dd (setup selectable)
Conversion Speed: 3, 7, 15, 30 (setup selectable)
Sensitivity: 1.0µV/Vsi for approved scales; 0.5µV/Vsi for non-approved scales.
Full Scale Range: 3mV/V
Linearity: 0.01% of full scale
Excitation: +5VDC, with sense (6 wires)
Number of Load Cells: Up to 4, 350 load cells
Offset Drift: ≤ 3.5 ppm /ºC
Span Drift: ≤ 3.5 ppm /ºC
A/D Converter Type: Sigma-Delta, ratiometric.
Filter: Digital filter, 3 stages
Count By: x1, x2, x5, x10, x50
Decimal point setting: between any digits of the weight display
Calibration Methods: dead load and span, store in EEPROM
Weighing Functions:

- Automatic zero tracking
- No motion detection
- Auto-zero on power-up
- Zero
- Tare
- GROSS/Net
- Print
- Units conversion

Serial Communication

Serial Output #1: RS232
Baud Rate: 300 - 9600 baud, full duplex
Applications: Continuous output, printer output, PC interface
Serial Output #2: RS232 or 20mA current loop, output only
Baud Rate: 300 - 9600 baud
Applications: Printer port

Environmental

Operating Temperature: -10ºC to +40ºC (14º to 104º F)
Storage Temperature: -10ºC to +70ºC (14º to 158º F)
Relative Humidity: 40-90% RH, non condensing

Display and Keyboard

Display: 6 digit, 7-segment, LED, 20.3 mm
Status annunciators: No motion, zero, net, units used (kg, lb, g, oz)
Weight Digits: 4, 5 or 6 (setup selectable)
Keyboard: 5 key membrane keyboard, with tactile feedback

Electrical

Voltage: 12VDC, using power adaptor 115 or 230VAC
Power: 8W

Enclosure

Heavy Gauge ABS
Dimensions: 1863x103x95 mm (7.32"x4.05"x3.74") LxHxD
Mounting: Desktop, Wall and Tilt mount

Approvals

NTEP certified per H-44 at 10,000d, OIML approval pending
Accuracy Class: III

Note: Specifications subject to change without notice